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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,948	04/14/2004	Pierre Bernadac	4-6-4-1	5432

7590 11/17/2006

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EXAMINER	
BAKER, STEPHEN M	

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 11/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/823,948	BERNADAC ET AL.	
	Examiner	Art Unit	
	Stephen M. Baker	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 2, 3, 5, 9, 12 and 16 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claims, or amend the claims to place the claims in proper dependent form, or rewrite the claims in independent form.

Regarding claim 2, the limitation is apparently inherent in claim 1, because a bit value with a greater "weight" is inevitably selected for output, which presumably has to be a bit with a weight of "1."

Regarding claims 3 and 14, the limitation is apparently inherent in the base claim, because a bit value with a greater "weight" is inevitably selected for output, which presumably has to be a bit corresponding to a "largest weight" sequence compared to the same sequence with "0" instead of "1."

Regarding claims 5, 12 and 16, the limitation is apparently inherent in the base claim, because a bit value with a greater "weight" is inevitably selected for output, which presumably has to be a bit that precludes an "all-ZERO" sequence.

Regarding claim 9, the limitation is apparently inherent in the base claim, because a random selection of bits which presumably avoids an "all-ZERO" sequence "with high probability."

2. Claims 3, 10, 13, 17 and 19 are objected to because of the following informalities: The claims also appear to be prolix in parts. Suggested amendments are provided below:

Appropriate correction is required.

1. A method at a decoder comprising:
selecting for output as each individual decoded bit in a block of bits from among all possible ~~bits~~ bit values, or in a sequence of bits ~~that comprise a block of bits~~ from among all possible sequences of bits, the bit value or the sequence of bits, respectively, that is determined to have a maximum likelihood; characterized in that:
for each individual bit in the block of bits, when each possible bit value is determined to be equally likely ~~for that bit~~, outputting ~~from among each possible equally likely bit value~~ the bit value whose weight is greater ~~than the equally likely bit value whose weight is a minimum~~, ~~and~~
or, for a sequence of bits, ~~together in the block~~ when more than one sequence is determined to have the ~~same~~ maximum likelihood, outputting the maximum likelihood sequence of bits whose weight is greater ~~than the maximum likelihood sequence of bits that has the minimum weight~~.

3. The method of claim 1 wherein for the sequence of bits when more than one sequence is determined to have the ~~same~~ maximum likelihood, the maximum likelihood sequence outputted is the sequence having the largest weight.

6. A method at a decoder comprising:
selecting for output as each individual decoded bit in a block of bits from among all possible bit values, or in a sequence of bits ~~together in a block of bit~~ from among all possible sequences of bits, the bit value or the sequence of bits, respectively, that is determined to have a maximum likelihood; characterized in that:
for each individual bit in the block of bits when each possible bit value is determined to be equally likely, randomly outputting one of the equally likely bit values, ~~and~~
or, for a sequence of bits when more than one sequence is determined to have the ~~same~~ maximum likelihood, randomly outputting one of the maximum likelihood sequences.

10. A method at a decoder ~~comprising:~~ for selecting for output, ~~for~~ as each decoded bit individually in a block of bits, the bit value ~~of a ZERO or a ONE that is~~ determined to be the most likely, characterized in that:

~~when~~ for each individual bit that a bit value of a ZERO and a ONE are determined to be equally likely, outputting the bit value of a ONE.

13. A method at a decoder ~~comprising:~~ for selecting for output as a decoded sequence of bits ~~in a block of bits~~ from among all possible sequences of bits, the sequence of bits ~~that is~~ determined to have the maximum likelihood; characterized in that:

when more than one sequence is determined to have the ~~same~~ maximum likelihood, outputting ~~from among those~~ the maximum likelihood ~~sequences the~~ sequence whose weight is greater ~~than the sequence having the minimum weight~~.

17. Apparatus comprising:

means for receiving set of soft symbol metric values representing a transmitted block of data bits;

decoding means for, in response to the received set of soft symbol metric values, ~~for~~ selecting for output as each individual decoded bit the bit ~~that is~~ determined to have a maximum likelihood, wherein,

when ~~for a bit~~ a ONE and ZERO are equally likely for a decoded bit, a bit value of ONE is selected for output.

19. Apparatus comprising:

means for receiving a set of soft symbol metric values representing a transmitted block of data bits;

decoding means for, in response to the received set of soft symbol metric values, ~~for~~ selecting for output as a decoded sequence of bits from among all possible sequences of bits, the sequence of bits ~~that is~~ determined to have the maximum likelihood, wherein,

when more than one sequence is determined to have the ~~same~~ maximum likelihood, the sequence outputted is the maximum likelihood sequence whose weight is greater ~~than the maximum likelihood sequence having the minimum weight~~.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 6 are apparently confusing in suggesting that a single decoder implementation would carry out both a greatest weight bit selection process and a greatest weight sequence selection process, apparently attempting to claim two distinct embodiments in a single claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-5, 10-12 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,287,516 to Schaub (hereafter "Schaub").

Schaub discloses a demodulator for binary FSK data. Schaub's demodulator includes a look-up table to produce a pair of likelihood values: a likelihood value corresponding to the received bit being a "1" and a likelihood value corresponding to the bit being a "0". The two likelihood values are then compared to decide which bit value was transmitted. When the likelihood of "1" and "0" are determined to be equal, the bit is decided to be a "1" (column 7, lines 20-33). Schaub's demodulator may be combined with an error detection code decoder which receives the bit decisions and the bit

likelihoods (column 9, lines 39+) wherein the codeword of the code defines a "block" or "sequence" of bits.

Regarding claims 4 and 11, fading (Fig. 2) is a wireless channel characteristic, so Schaub's channel is presumably a wireless channel.

7. Claims 1-5, 10-17, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,061,823 to Nara (hereafter "Nara").

Nara discloses decoding arrangements for a wireless receiver, including a Viterbi decoder that outputs a maximum likelihood sequence and a reliability measure for each bit of the maximum likelihood sequence, these reliability measures being the branch metric decision difference for each bit. Responsive to the result of a subsequent CRC check, bits of the maximum likelihood sequence output from the Viterbi decoder are selectively inverted, in the order of least reliable bits first. A branch metric decision difference of zero defines the lowest possible reliability measure and thus presumably designates the first bit to be flipped whenever such a reliability measure condition occurs. If the original decision of the Viterbi decoder for such a bit is not "1", then it will be inverted to "1" for a second try at passing the CRC check. Consequently, Nara discloses "for a sequence of bits together in the block when more than one sequence is determined to have the same maximum likelihood, outputting the maximum likelihood sequence of bits whose weight is greater."

8. Claims 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,586,128 to Chen (hereafter "Chen").

Chen discloses decoding arrangements for a wireless receiver, including a Viterbi decoder that outputs a maximum likelihood sequence. If there is a tie when comparing path (sequence) metrics, one of the path (sequence) metrics is selected at random (column 2, lines 6-7). Consequently, Chen discloses "for a sequence of bits when more than one sequence is determined to have the same maximum likelihood, randomly outputting one of the maximum likelihood sequences."

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schaub.

Schaub does not mention application in turbo code decoder for the bit decision process described above. Official Notice is taken that it is well known to decide ties in soft-decision decoding either randomly or systematically. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to apply Schaub's "1"-selection processing in the event of a "1"-"0" tie to a turbo decoder output. Such an application would have been obvious because it is well known to decide ties in soft-decision decoding either randomly or systematically.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. Baker whose telephone number is (571) 272-3814. The examiner can normally be reached on Monday-Friday (11:00 AM - 7:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stephen M. Baker
Primary Examiner
Art Unit 2133

smb